Statement of Work (SOW)

for

DIMINISHING MANUFACTURING SOURCES (DMS);

DESIGN, DEVELOPMENT,

MANUFACTURING, TESTING;

SUSTAINMENT ENGINEERING;

and

TECHNICAL SERVICES

Air Force Materials Command (AFMC)
Warner Robins Air Logistics Center

3 August 2000

TABLE OF CONTENTS

1.0 SCOPE

This Statement of Work (SOW) defines the requirements for Diminishing Manufacturing Sources (DMS), Design, Development, Manufacturing, Testing, and Sustainment Engineering and Technical Services. The requirements include acquisition of services (including Advisory & Assistance Services), development of and delivery of system and subsystem hardware and software applications. Robins AFB, GA requires assistance and capability in the:

- Obsolescence management, research, design, development, test and evaluation, manufacture documentation of airborne and ground-based systems/hardware to support Department of Defense (DoD) requirements.
- Tasks and activities in support of; hardware/software systems engineering, support and integration; hardware/software systems documentation development, maintenance, and configuration management, and software design, development, and test.
- Engineering and technical services to include configuration management control required to research, develop, and maintain engineering changes to avionics, radar, and logistics systems.
- Acquisition support, weapon system management, engineering/technical support, logistics support, supply and inventory management, configuration management, weapon system maintenance, manufacture or acquisition of spares for prime mission and support equipment, repair of prime mission and support equipment, upgrade and modification of automated test equipment (software and hardware), material, travel, and data in support of labor.

1.1 Objective

The objective of this procurement is to obtain core technical capability and expertise to provide research, development, and associated services and products utilizing sustainment tools and databases for Diminishing Manufacturing Sources (DMS) issues. Engineering support shall be required in the areas of acquisition support; weapon system software management; engineering and technical logistics support; supply and inventory management; software configuration management, manufacture or acquisition of spares for prime mission and support equipment; repair and upgrade of prime mission/support equipment; upgrade and modification of automated test equipment (software and hardware); material; travel; and data by a "total solutions" provider.

1.2 Purpose

The purpose of this requirement is to expand WR-ALC capability to provide engineering analysis, technical data evaluations and reports, and allow the in-depth attention required to execute high quality, cost effective, and timely engineering, logistics, and software solutions to anticipated development, modifications, or sustainment activities to support weapons platforms. The contractor shall provide technical expertise leading to the supportability, obsolescence and diminishing manufacturing sources management, maintainability, and availability of present and future weapons and support systems.

The contractor shall provide research, technical support and analysis, evaluation, design, fabrication, integration, installation and testing of specified systems/hardware/software required by each delivery order. In addition, the contractor shall validate any documentation, software or associated programming or design/development instructions required by the delivery/task order.

1.3 Product Support Areas

The product support areas that shall support this Statement of Work are defined within this section.

1.3.1 Diminishing Manufacturing Sources (DMS) Management and Services.

This product area identifies impending shortages of components resulting from manufacturing phase- out or technology obsolescence; i.e., those LRU and SRU components that are no longer procurable due to diminishing manufacturing sources (DMS). The contractor shall develop and deliver an engineering management tool and service that provides availability, cost/schedule/risk tradeoff, life cycle analysis, and alternate part solutions to the system material managers. System hierarchical analysis and resupply options are an additional requirement of this product area.

1.3.2 Design, Development, and Manufacturing

This product area includes all activity related to the design, development, and manufacture of components, assemblies, subsystems and systems used in military aircraft, missiles, ships, vehicles, weapons and communications equipment. This product area further includes the design, development, modification, test, and installation of software (e.g., Operational Flight Program, Test Program Sets, simulations, database tools, etc.). The contractor shall provide complete hardware and software design, development, test, verification, and transfer capability. The product range also includes digital, analog and RF electronics design, manufacturing qualification, and support to organic and depot level logistics support systems. The contractor shall design, develop, and manufacture all components, assemblies, subsystems and systems after employing a proven DMS system to minimize electronic component obsolescence risk

1.3.3 Independent Engineering Testing, Analysis and Study

This product area includes all independent engineering design and testing of weapons systems/subsystems hardware, software or firmware components utilizing government, contractor or other commercial facilities available to the contractor. The contractor shall furnish the government DMS-based analysis of electronic component part obsolescence IAW DI-MISC-81384/T to include but not be limited to future year non-availability status, out-year manufacturing and sustainability, and component vendor production viability projections. When ordered, the contractor shall report to the government on the feasibility and practicality of modifying systems to satisfy a specific operational requirement.

1.3.4 Fabrication of Prototypes

Upon completion of a requirement for fabrication of prototype items or kits, which, when required, will normally follow completion of an engineering effort, the contractor shall fabricate the required number of units as necessary to satisfactorily complete the task prototype requirement. Prototype items or kits shall meet minimum requirements necessary to provide adequate performance parameter measurement including but not limited to an analysis of electronic component part viability using a DMS tracking methodology. The government will define in the task/delivery order those prototypes which were furnished to the government by the contractor and which may, in turn, be utilized by the contractor in conjunction with specific work assignments.

1.3.5 Technical, Engineering, Management, and Sustainment Support

This product area includes all activities and duties necessary to effectively manage product items within the DoD logistics systems to include item management, engineering and technical services and program management support. The primary management disciplines encompass the following: modification, configuration, technical, production, data, financial, and program management. The contractor shall provide technical/logistics support services to conduct analyses including but not limited to DMS studies, and perform functions associated with related equipment design upgrades. These services may be used by government management as a basis for decision-making, program planning, and budget forecasting. The products shall be the source data for providing the program

manager with the ability to model the effects of changes in program schedules, funding shortfalls, and life cycle cost assessments.

1.3.6 Ground Support Equipment

This product area includes all activity related to the design/development and manufacture of ground support equipment (e.g. automatic test equipment (ATE), trainers, containers, handling equipment, etc.) used in the testing and maintenance of military electronic components, assemblies, subsystems and systems. The contractor shall be able to develop, modify, and manufacture test program sets in support of host test stations. Interface device and interface test adapter development and automatic test equipment capabilities shall be required. The contractor shall make recommendations and projections relevant to ground support equipment resources system and sub-system sustainability and viability based on embedded electronic components obsolescence analysis.

1.3.7 Training and Simulation

This product area includes all products related to training and training simulation. The contractor shall include the design and manufacture of training devices for individual and systems training (e.g. maintenance trainers, captive air training missiles/munitions, etc.). Such devices shall be designed and manufactured using those parts that Diminishing Manufacturing Sources (DMS) analyses have shown to be viable for the period designated by the government in the individual task/delivery order. Enhancements shall include modifications of simulation software, electronics, and hardware, preparation of technical manuals/documents and on-site support training

2.0 REFERENCE DOCUMENTS

Unless otherwise specified, the following documents form a part of the Statement of Work and are to be used for general guidelines only.

DI-ATTS-80041A	Test Requirements Document (TRD)
DI-ATTS-80282B	Acceptance Test Procedures (ATP)
DI-CMAN-80639	Engineering Change Proposal
DI-CMAN-80643B	Specification Change Notice
DI-MGMT-80227/T	Contractor Progress, Status and Management Report
DI-MISC-81384/T	Service Engineering Report
DI-MISC-81454A	Automated Computer Program Numbering System Data and Control System
DI-ADMIN-81250A/T	Conference Minutes
DI-ADMIN-81249A/T	Conference Agenda
DI-MGMT-81468/T	Contractor Funds Status Report
DI-DRPR-81000A	Products Drawing and Associated Lists
DI-SAFT-80101A/T	System Safety Hazard Analysis Report (SSHA)
ISO9001	Quality System
TM-86-01H	Air Force Technical Manual Contract Requirements

3.0 REQUIREMENTS

The contractor shall perform the tasks listed below to support WR-ALC and other DoD activities in the areas of weapons systems, support equipment, and other logistics support programs associated with weapon system supportability issues. Obsolescence management, manufacturing, technical services, prototyping, engineering, and

upgrade and retrofit design/manufacture will be described fully in delivery orders to be issued by the contracting officer.

3.1 Diminishing Manufacturing Sources (DMS) Support and Services

The contractor shall provide extensive DMS support as required by the customer. This support shall include, but not be limited to: management of the Component Obsolescence Database; continuous assessment of component availability for customer systems; detailed engineering evaluations and support for DMS component issues; alerting the customer of DMS issues specifically affecting their systems; and providing recommendations to the customer for resolving DMS issues based on cost, risk or other critical management factors.

3.1.1 Component Obsolescence Database Maintenance

The contractor shall analyze the weapons or support system technical data documentation supplied by the customer and incorporated into the Component Obsolescence Management system and update the database to the current hardware configuration. The contractor shall incorporate the change information into the Component Obsolescence database while maintaining configuration control of the database and verify that the update is both complete and did not degrade the pre-existing data. Maintenance of the database shall include modifications and upgrades as required to maintain compatibility with software and hardware at the customer facility. Capability, functionality or feature enhancements of the Component Obsolescence Management software application shall be incorporated via configuration control process to meet the changing needs of obsolete device management.

3.1.2 Component Parts, Strategic Manufacturers/Distributors Tracking

The contractor shall have a staff with in-depth knowledge of semiconductors and the semiconductor industry. The contractor shall have adequate staff and facilities in place to track, through vendor polls, etc., the qualified strategic manufacturers/distributors of parts contained in the Component Obsolescence Management database. The contractor shall maintain the government's pro-active obsolescence prediction capability for the weapons systems vendor status. The contractor shall monitor life cycle trends of integrated circuit families (i.e. TTL, LSTTL Bipolar Logic) in order to closely predict the demise of device groupings affecting the weapons systems. The contractor shall develop and implement, in conjunction with the customer, a standard case file for use with problem devices which warrant formal action, delineating options and firm recommendations by the contractor. These files shall become an integral part of the Component Obsolescence Management database and shall be updated quarterly as part of the Component Obsolescence Management database update.

3.1.3 Component Parts, Non-Standard Parts Management

The contractor shall provide management of all non-standard parts contained in the Component Obsolescence Management system as required by each delivery order. This includes all hybrids, ASICs, oscillators and custom devices which are OEM specific and cannot be found in standard part catalogs.

3.1.4 DMS Technical and Engineering Support

The contractor shall provide dedicated DMS technical, management, and analysis support through extensive use of the Component Obsolescence Management application. The contractor may also be required to provide dedicated DMS Reliability Engineering Support to enhance data and analyses derived from the DMS program. Special reports and analyses shall be provided in accordance with individual delivery orders. The government will provide the hardware specifications, amendments, work space, and access to government support equipment as required.

3.1.5 Component Solution Engineering Services, Research and Solution Recommendations

The contractor shall assist in the assessment and resolution of obsolescence issues as they arise. This includes, but is not limited to, analysis and evaluation of technical proposals for particular piece-part obsolescence resolution by industry piece-part manufacturers and Original Equipment Manufacturers (OEM). This also includes examination, investigation, and identification of piece parts and their qualified sources, for which the government does not have engineering data.

3.1.6 Component Obsolescence Management Application Capability Expansion

The contractor shall provide Component Obsolescence Management application enhancements and additional capabilities to the currently existing application. The additional functions shall include retrieval of legacy system data and evaluation of existing Government databases to provide logistics information for critical, decision-making level of effort, as required to meet customer needs. Examples of types of data to be accessed: usage rates, system program demand, reliability data, inventory control, other critical logistics support data, and special reporting functions.

3.2 Design, Development, Manufacturing, and Test Solutions

A request for systems design, development, manufacturing, integration, and testing will normally be made in conjunction with a requirement for analytical or modification engineering. When specifically directed, the contractor shall accomplish this type of service in connection with problems and proposed changes or modifications generating from other government or commercial sources or as the result of projections of obsolescence identified by Diminishing Manufacturing Sources (DMS) analyses. Upon receipt of a requirement for a design, development, manufacture type of effort, the contractor shall accomplish such changes to individual equipment or subsystems to ensure compatibility, maintainability and viability of the weapons system. Engineering reports IAW DI-MISC-81384/T shall be submitted upon completion of any design/development/manufacturing/test effort.

3.2.1 Design

After performing a complete and exhaustive search using the contractor-developed DMS system and with the use of applicable documents, the contractor shall provide design engineering and analytical support services in conjunction with specific weapons systems development programs. Such effort shall include the evaluation of existing systems, sub-systems, and associated support systems undergoing modifications, as well as the analysis of new systems, sub-systems, and support equipment systems with the aim of defining how best to meet performance, production and related support requirements. In general, the weapons systems/subsystems fall into the areas of avionics, electronics, flight test instrumentation, aeronautical/ground support equipment, trainers, containers, etc. Contractor effort shall also include equipment and system upgrades/modifications/repairs that improve the characteristics listed below:

- Maintainability
- Reliability
- Interoperability with other systems
- Human Factors
- Cost

3.2.2 Development of Prototypes

The contractor shall design and provide development of prototype weapons systems/subsystems, and associated support equipment/devices that may result from DMS shortfalls. The contractor shall further assist in developing and/or modifying existing systems and devices including, but not limited to weapons systems /subsystems, support equipment (test cells, automatic test equipment, handling equipment, etc.) and other electronic and ancillary devices. The contractor shall be responsible for developing/manufacturing prototypical systems required to demonstrate the solutions to satisfying operational needs and requirements for the various systems. The contractor shall manufacture and assemble the components and test for system operability.

The contractor shall be required to manufacture and conduct limited-scale experiments of new operational maintenance procedures, components or workstations and test equipment, as part of a prototype system development project. In such cases, the contractor shall lease or purchase selected hardware in order to contract an experimental test bed. Lease or purchase of equipment will be identified in the individual delivery orders.

The contractor shall be required to investigate, design, and build to print special, experimental devices and equipment that shall allow for the testing and checkout of electronic devices, systems, and simulators. In some instances, such test equipment may become standard items for maintaining an airborne electronic system or device and may become an integral part of the device. For example, a Built-in Test (BIT) device could become part of that device. As such, the standard logistical considerations such as reliability, maintainability, and future obsolescence, as based on projections from the contractor-developed DMS system, must be a consideration of the system cost as well as a life-cycle consideration.

3.2.3 Prototype Manufacturing and Delivery

The contractor shall provide personnel, material, and facilities necessary to manufacture prototype weapons systems/subsystems; support equipment; containers; training devices; electronics/electronic systems, subsystems and support equipment; and perform precision metal fabrication (e.g., CNC machining, welding, etc.) The prototype manufacture of equipment shall be defined in individual delivery orders. The contractor shall be required to manufacture prototype wiring, cabling, and interconnections as necessary to ensure compatibility with all existing and modified equipment. Quantities of manufactured prototype items will be in accordance with the individual task/delivery order.

The contractor shall review and/or develop and submit packaging and preservation, handling, storage, marking, and transportation requirements for parts, subassemblies or assemblies in accordance with individual task/delivery orders.

3.2.4 Engineering and Equipment Testing

The contractor shall be required to establish test programs associated with requirements defined in each individual delivery order and shall be designed to verify that the system/device and the integration of all subsystems/equipment meet the technical and operational requirements as stated in each delivery order. The contractor shall prepare Acceptance Test Procedures (ATPs) and other associated test documentation in accordance with government-approved standards as detailed in each delivery order.

The contractor shall conduct testing in total or shall support Government test personnel as specified by individual delivery/task orders. The contractor shall ensure that all hardware, software, test equipment, instrumentation, supplies, facilities, and personnel are available and in place to conduct or support each scheduled test. The government reserves the right to perform any of the tests set forth in the delivery order where such tests are deemed necessary to assure supplies and services conform to the prescribed requirements.

Contractor-directed tests shall be performed in accordance with the approved ATP and/or other appropriate government-approved test plans. Test procedures shall be written so that they can be performed by a qualified technician. Test results shall be documented in the ATP. Throughout the period of performance, the contractor shall perform the following types of testing to be documented in accordance with DI-MGMT-81384/T. The types of test shall include but not be limited to:

- Static and dynamic testing
- Mission testing
- Stress testing
- System operation testing
- Structural testing

- Electrical/electronic testing
- Hardware and software component testing
- Subsystem and system level development testing
- System compatibility testing
- Acceptance testing
- Functional testing
- Integration testing
- Full qualification testing
- Field-testing and evaluation
- Environmental tests and environmental stress screening
- Electromagnetic interference/compatibility testing

3.2.5 Independent Engineering Testing

Independent engineering tests shall consist principally of laboratory testing of software or firmware components utilizing government, contractor, or other government-approved commercial facilities. Items, routines, or modules required to be tested will be furnished to the contractor as Government Furnished Property (GFP), except as may be designated by each request as Contractor Furnished Property (CFP) and authorization for contractor procurement is so stipulated. When an order includes a requirement to independent engineering tests, the contractor shall conduct such tests in accordance with government-approved requirements. Upon completion of such tests, the contractor shall immediately submit results IAW DI-MISC-81384/T and findings to the extent required by each task assignment.

3.3 Technical Data Package

The contractor shall develop/produce maintain a Technical Data Package (TDP) that accurately depicts the final validated/verified hardware/software product IAW DI-DRPR-81000A/T. The TDP shall provide the necessary integration, design, engineering, manufacturing, testing and quality assurance requirements information necessary to duplicate the physical and performance characteristics of the final product, without additional design engineering effort or recourse to the original design activity. The TDP shall be free of any limited rights or proprietary markings. Technical Manual Contract Requirements shall be generated IAW TM-86-01H with appropriate tailoring.

3.4 Software Engineering and Development

The application of Diminishing Manufacturing Sources (DMS) and component obsolescence management applications and methodologies may expose areas of weapons system vulnerability with relation to software programs, which drive a given weapons system's internal computer subsystems. The contractor shall design, develop, test, verify, modify and, with the government approval, implement and manage software code changes to existing and future government software to include, but not limited to, avionics and radar suites. The following are examples of tasks associated with software engineering. Specific engineering/development requirements for each software system will be detailed in the individual task/delivery order.

3.4.1 Software Engineering

The contractor shall perform all activities and deliver products related to design, development, test, verification, modification, and transfer of software utilized in existing and future weapons systems/subsystems and support equipment. When a requirement is established to provide software engineering, the contractor shall accomplish, but not be limited to, the following:

- Develop a technical description of how the required operational requirement will be fulfilled by the generation of or change in the software.
- Assess the impact of the software change(s) on the existing software and upon support equipment configuration/requirements.
- Provide all cost and schedule information for the required software changes. This information will include, but will not be limited to the following categories:
  - Engineering
  - Testing
  - Technical and engineering data
  - Installation/Transfer
- Write a software module specification which will include but not be limited to the following:
  - Overall description of the software
  - A high level flow chart
  - A description of each individual module and its interrelations
  - A description of the input data and their source
  - A description of the output data or the software's function.
- Upon completion of the preliminary design specification, or upon being supplied this information, the contractor shall write a detailed design specification which shall include, but not be limited to the following:
  - Detailed description of the software package.
  - Complete flow chart of the software package
  - A detailed description of the individual modules along with their inputs and outputs.
- When the requirement is established to provide a software prototype the contractor shall write the software described in the detailed design specification, using the programming concepts specified in the order.
- The contractor shall evaluate, by the use of government approved testing facilities and techniques, the software described in the detailed design specification or other Air Force approved documentation and shall evaluate and validate that the software provides the specified functions within the limitations/criteria of the design specification.
- The contractor shall be responsible for the analysis/review of the requirements and performance characteristics of approved Engineering Change Requests (ECR) and submission of data reflecting the analysis, as specified in each delivery order. Budgetary estimates reflecting the contractor 's investigation shall accompany the analysis report. The applicable ECRs will be provided by the government with the delivery order.
- Upon government approval of the ECRs, the contractor shall:
  - Update and document all changes to the software using assembly language coding, higher order language, e.g., ADA, Jovial, Fortran, C++, ATLAS, SQL, and other programming languages and configuration management techniques and practices when applicable.
  - Update and document the analysis to ensure the proper operation of the OFP updates.
  - Collect and analyze the detailed test data from lab and flight tests.
  - Investigate, correct, and document other found errors.
  - Identify any deficiencies via Problem Report forms. Problem Report forms are internal reporting forms used to report AISF deficiencies and will be made available to the contractor.

3.4.2 Software Documentation

The contractor shall update, automate, and host on Government Owned Equipment the documentation detailing the operations and interoperability of the software. The documents shall be updated to their highest and latest revision level and maintained under configuration management control. The government will provide the documents to be converted.